“TECHNICALLY ANTIQUATED, SLOPPY AND EQUIVALENT TO HIGH SCHOOL LEVEL WORK.”

That is how Dr Sainsbury, MDEQ’s Mining Expert, characterized the analysis of mine stability in the KEMC Application for Mining Permits at the Eagle Ore Deposit, submitted February 2006.

His conclusion: “NOT CONSIDERED TO BE DEFENSIBLE.”

But MDEQ accepted the application anyway.

May 12, 2011

JACK PARKER AND ASSOCIATES, INC.

ROCK MECHANICS • MINING • GEOLOGY

PO BOX 255
SOUTH RANGE, MI 49963

906-482-0099

OBSERVATION • MEASUREMENT • ANALYSIS • DESIGN

"TECHNICALLY ANTIQUATED, SLOPPY AND EQUIVALENT TO HIGH SCHOOL LEVEL WORK."
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But MDEQ accepted the application anyway.

May 12th 2011

1. INTRODUCTION. This is not a law suit. We are suing nobody. We are not pointing fingers at anybody in particular. We are not interfering in existing litigation. We come in peace, with a job to do.

We are a small group of concerned citizens who recognize that litigation between Kennecott (KEMC) and various opponents has gone on for five years without reaching a conclusion – while Kennecott has assumed the right to construct and to mine at will - and has done so.

Appeals have been delayed for many months and oral arguments are scheduled for June 9th. The judge is faced with mountains of paperwork which we consider to be irrelevant. We believe that there is an obvious shortcut to reaching the correct conclusion – to benefit both the judge and the people.

In early 2006 experts for both the DEQ (the regulating agency) and the opposition declared that the application for permits to mine was wholly inadequate, incompetent, inaccurate, unprofessional, deceptive and fraudulent and that, if followed, it would, *without doubt*, endanger lives, property and the environment. Strong words, but without doubt the application should have been rejected at that time.

The criticisms went unanswered. They were not even discussed in court.

Further study has only reinforced the conclusion. The mining plan is unbelievably amateurish and/or thoughtless. It blatantly ignores most of the requirements of the applicable mining laws, Part 632 in particular. The DEQ does not enforce the law. Having no mining expertise it simply hands out permits on demand.

We present pertinent quotations from the experts and have included unedited copies of their originals so that they can be examined in context if need be.

We simply seek belated rejection of the application and revocation of all permits and agreements immediately, to be followed by justice as prescribed by Part 632. A copy of 632 is provided under separate cover.

2. A DIFFICULT SITUATION. The unencumbered truth is that Kennecott did knowingly submit a deceptive, fraudulent application for permits to mine the Eagle deposit in Marquette County in the Upper Peninsula of Michigan.

That was in February 2006. Since that time Kennecott has ignored the evidence and has distracted attention systematically while actually assuming the right to grant the permits to themselves, then embarking upon the mining activities, in defiance of Michigan Mining Law, Part 632.

While doing so they have recruited support from the Michigan DEQ and DNR, from the various "experts" they employed to produce the application and from local government authorities. They did that by providing to them design data which had been doctored, manipulated to ensure that permits would be granted very quickly. Although those parties should be censured for not detecting the doctoring and for not insisting on raw data and first-hand inspection and spot checks on data – we would apply penalties only for their topmost leaders, but complete exoneration from blame for their subordinates. After all – who would normally expect global mining giants, such as Kennecott and Rio Tinto of London, to cheat and lie deliberately? Even the Administrative Law Judge was seduced. Innocents were caught in Kennecott's tangled web. To them we quote: "Go thy way and sin no more."

We confine our efforts here to showing, without doubt, that the application should have been rejected in February 2006 and, since that did not happen – that it should be rejected immediately, i.e. without delay.

Then the law can take over – assigning and enforcing the penalties clearly prescribed in Part 632. It would begin, of course, by revoking all permits and agreements concerning the project, including the leases. KEMC played a crooked game and they lost. The details are interesting and never to be forgotten, but they are not pertinent at this juncture.

The evidence is so clear that common sense should have precipitated rejection of the application, without even going to court.

Would-be critics should study the application, not the propaganda.

To forestall tactics that this matter is "in litigation" we have avoided contentious evidence, presenting only the early opinions of independent experts, which were ignored. They will suffice to show, without doubt, that the application should have been rejected.

3. OPINIONS FROM EXPERTS. In April of 2006 independent Mining Engineer **Jack Parker** and Professor **Stan Vitton** of Michigan Tech were hired by the National Wildlife Foundation (NWF) to evaluate the mining, geological and geotechnical aspects of the application.

Within a couple of weeks we were so appalled by the document that we recommended that it be returned to sender, collect. Beginning with spelling and grammatical errors that should have been caught by ANY proofreader, then poor definitions of terms which should have been corrected by ANY engineer, then technical errors and omissions which any of the mining people involved should have noticed – the document, coming from prestigious names such as Kennecott, Rio Tinto, Golder Associates and McIntosh Engineering, should have been a pleasing and shining example. Instead it was miserable (to be pitied). The first page of our report to NWF, dated Dec 6, 2006, is included for you to see (Figure 1).

As we studied the application in detail (four years without pay) it got worse. We could see that there had been not one independent analysis. Kennecott had doctored the data and presented that to all analysts, designers and regulating agencies, covering up the geological defects, short-changing tests of rock properties and making many false claims and assumptions. In college the document would have been flunked and penalized at sophomore level. MDEQ raised no objections.

JACK PARKER AND ASSOCIATES, INC.
ROCK MECHANICS – MINING – GEOLOGY
PO BOX 255, SOUTH RANGE, MI 49963
Tel: 906-482-0099

Review of the Kennecott Eagle Minerals Company
Application to Mine,
Submitted to MDEQ February 2006

Review by Jack Parker and Stan Vitton, December 6th 2006

1. THE MISSION:

The instructions to Messrs Vitton and Parker, as listed in a Professional and Technical Services Contract dated August 18th 2006, paragraphs 1a and 1b, are as follows:

"1a. Review and comment on KEMC application to mine submitted to the MDEQ in February of 2006. The contractor shall advise NWF on any shortcomings and questionable technical information contained in the application, specifically those related to the mine plan and subsidence.

1b. Predict, within a reasonable manner, environmental impacts of KMC's "Project Eagle" in Marquette County, Michigan USA. The contractor shall develop predictions of the environmental impacts of Project Eagle, based on technical information that is available regarding proposed mine plans, existing technical data, and especially impacts from potential subsidence and the contractors' experiences and data from other mine sites. The amount of data will determine the level of confidence in such predictions. The contractor shall summarize their conclusions in a technical memorandum; further discussions regarding the format for presenting this information should take place."

2. THE APPROACH AND THE CONCLUSIONS.

Messrs Vitton and Parker reviewed and commented on the application independently to produce two viewpoints, to be submitted under one cover. This document is Parker's viewpoint, mostly concerning geology and mining plans. Stanley's are attached, they cover mostly the theoretical and computer analyses. Our comments sometimes overlap.

Short, interim reports were written earlier this year. Copies are attached.

My first was entitled "Comments on the KMC application, June 2006". It may best be summed up by quoting as follows: "Some of my comments may have been too critical but my overall conclusion is that there are so many errors and omissions that the document (the Application) should be "returned to sender" as unacceptable.

1

Figure 1. First page of a report written by Mining Engineer Jack Parker and Professor Stan Vitton of Michigan Tech to review the KEMC application to mine (December 2006).

Both Kennecott – the "owner", and Foth – who prepared the application, lied when both proclaimed, in covering letters, that the document had been prepared in accordance with the requirements of Part 632 of the Michigan Mining Law (See Appendix A for copies of the two letters). In fact time and again they simply ignored those requirements. Time and again their errors and omissions, if followed, would lead to failure of the systems and endangerment of structures, life and limb, and environment. 632 frowns upon those shortcomings. One might well conclude either that they had not bothered to read those few pages in 632 or that the lies were deliberate. In court MDEQ "Mining Team Leader", under oath, testified that adherence to 632 was NOT considered when they evaluated the application.

An unadulterated copy of 632 accompanies this document in case you should wish to check statements made here. It has been readily apparent that very few people are familiar with the contents.

Our protests were simply ignored, as if Kennecott had been assured that they had nothing to worry about – that they could do whatever they wanted to do. And they have done that, with absolute arrogance.

Copies of the original application are readily available, so too are the reports by Parker and Vitton, for the NWF, and Sainsbury and Blake – experts for MDEQ.

Note that the original application and the Sainsbury reports (once suppressed) have again been removed from the MDEQ Kennecott site. If you cannot locate them simply ask us for them.

Ours are the opinions of respected, experienced, independent mining engineers with no axe to grind but a reputation for integrity to preserve. On the other side is a prize worth more than 4.7 billion dollars. $4,700,000,000.00.

****

Michigan DEQ, rightfully realizing that they had insufficient expertise to evaluate an application for mining permits, contracted with **MFG, a Wisconsin consulting group, for help with the engineering aspects.** MFG, with no mining expertise, subcontracted with **David Sainsbury of Itasca Consulting, Minneapolis –** a well respected expert, worldwide, in mine design and mining practices.

Judge for yourself what the MDEQ-hired expert thought of the application.

Before you go any further please turn the page and read the following executive summary of his initial report to MFG and MDEQ. It would be a good idea to highlight it in two colors, red for adverse comments and green for supportive comments. Please do that. Go ahead. It will take only five or ten minutes. Remember that he was their expert.

Executive Summary

There is concern that mining-induced subsidence will adversely affect the hydrologic environment surrounding the proposed Kennecott Eagle Mine in the Upper Peninsula of Michigan. The objective of this review is to determine whether the conclusions made within the Eagle Project Mining Permit Application regarding crown pillar subsidence and hydrologic stability are defensible.

Due to the difficulties associated with determining the mechanical properties of a particular rock mass, mining rock mechanics can be a subjective science. However, many best-practice data collection and analysis techniques have been established to eliminate many of the uncertainties associated with prediction of the response of a rock mass to mining.

The analysis techniques used to assess the Eagle crown pillar stability do not reflect industry best-practice. In addition, the hydrologic stability of the crown pillar has not been considered. Therefore, the conclusions made within the Eagle Project Mining Permit Application regarding crown pillar subsidence are not considered to be defensible.

The Scaled Span analysis conducted clearly indicates that stability of the proposed Eagle crown pillar should be a concern, although this concern has not been raised within the conclusions of the Eagle Project Geotechnical Study. Considering the sensitive nature of the hydrological environment surrounding the Eagle project, further detailed analysis should be conducted to fully understand the expected short- and long-term crown pillar subsidence and hydrologic stability.

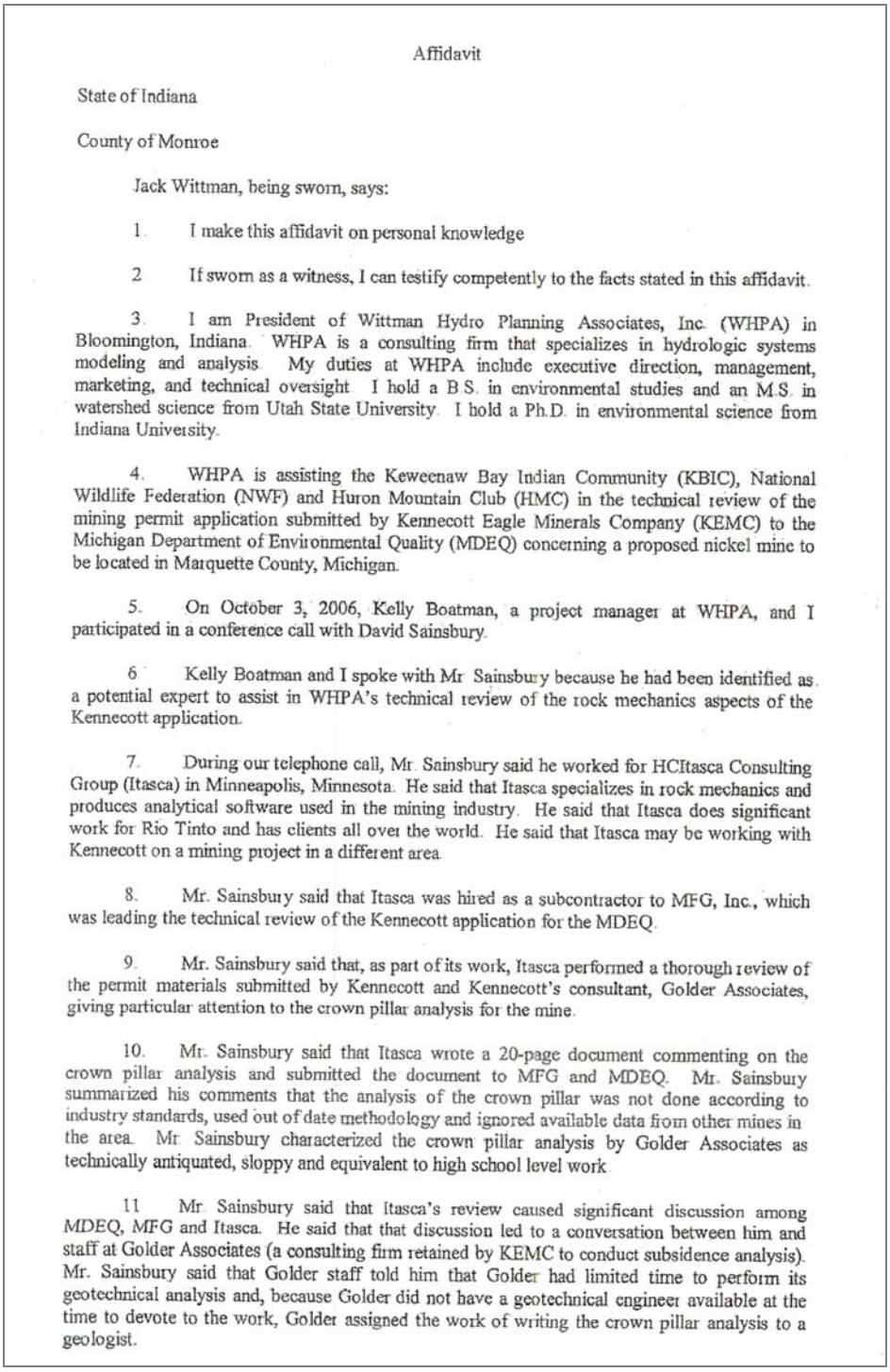
Specific issues that impact the conclusions made regarding the crown pillar stability are detailed below.

- The ASTM Standard Test Method D 5731-95 (ASTM, 1995) states that point load test results alone should not be used for design or analytical purposes.
- The procedure used to determine the equivalent UCS is based upon procedure no longer current within the mining industry. This method used is inconsistent with the current standard test methods for determining the point load strength index of rock. The point load testing approach that was adopted causes significant uncertainty in the intact rock strength that was determined for each lithological unit.
- The horizontal stresses assumed throughout the stability and subsidence analyses have been underestimated. Based upon the excessive horizontal stresses observed at the White Pine Copper Mine in the Michigan Upper Peninsula (Parker, 1966), a sensitivity study should be conducted to determine crown pillar behavior under a variety of possible horizontal stress conditions.
- A discrete sub-vertical fault plane that intersects the Eagle deposit has not been considered in any of the stability or subsidence analyses.
- Considering the very low factor of safety achieved with the Scaled Span analysis, and Carter's suggestion that a factor of safety of 1.2 represents a very short-term serviceable life, the possibility of crown pillar failure should be a serious concern.
- Considering the uncertainties with the modeling input parameters and the significant limitations of the elastic analysis, a very low level of confidence should be applied to the predicted subsidence levels of the Eagle crown pillar.
- Crown pillar hydrologic stability was not considered in the crown pillar subsidence analysis or the bedrock hydrogeological investigation.
- The long-term, time-dependant behavior of the Eagle crown pillar was not considered as part of the analyses. Carter (2000), Carter and Miller (1996) and Hutchinson (2000) indicate that the time-dependant degradation of surface crown pillars is a serious concern.

Figure 2. Executive Summary from a report written by David Sainsbury, a respected expert in mine design and mining practices hired by the Michigan DEQ to review the KEMC application to mine (May 2006).

An executive summary such as this is prepared for busy people to read, who know little about the technical content of the report – but to give the general picture, as clearly as possible.

While you are in the evaluating mode please highlight the next document too. Another consultant, Dr Jack Wittman, called Dr Sainsbury to enlist his help on other issues. He then prepared a signed and notarized affidavit to summarize his telephone conversation with Sainsbury.



Affidavit

State of Indiana

County of Monroe

Jack Wittman, being sworn, says:

1. I make this affidavit on personal knowledge

2 If sworn as a witness, I can testify competently to the facts stated in this affidavit.

3. I am President of Wittman Hydro Planning Associates, Inc. (WHPA) in Bloomington, Indiana. WHPA is a consulting firm that specializes in hydrologic systems modeling and analysis. My duties at WHPA include executive direction, management, marketing, and technical oversight. I hold a B.S. in environmental studies and an M.S. in watershed science from Utah State University. I hold a Ph.D. in environmental science from Indiana University.

4. WHPA is assisting the Keweenaw Bay Indian Community (KBIC), National Wildlife Federation (NWF) and Huron Mountain Club (HMC) in the technical review of the mining permit application submitted by Kennecott Eagle Minerals Company (KEMC) to the Michigan Department of Environmental Quality (MDEQ) concerning a proposed nickel mine to be located in Marquette County, Michigan.

5. On October 3, 2006, Kelly Boatman, a project manager at WHPA, and I participated in a conference call with David Sainsbury.

6 Kelly Boatman and I spoke with Mr Sainsbury because he had been identified as a potential expert to assist in WHPA's technical review of the rock mechanics aspects of the Kennecott application.

7. During our telephone call, Mr Sainsbury said he worked for HCItasca Consulting Group (Itasca) in Minneapolis, Minnesota. He said that Itasca specializes in rock mechanics and produces analytical software used in the mining industry. He said that Itasca does significant work for Rio Tinto and has clients all over the world. He said that Itasca may be working with Kennecott on a mining project in a different area.

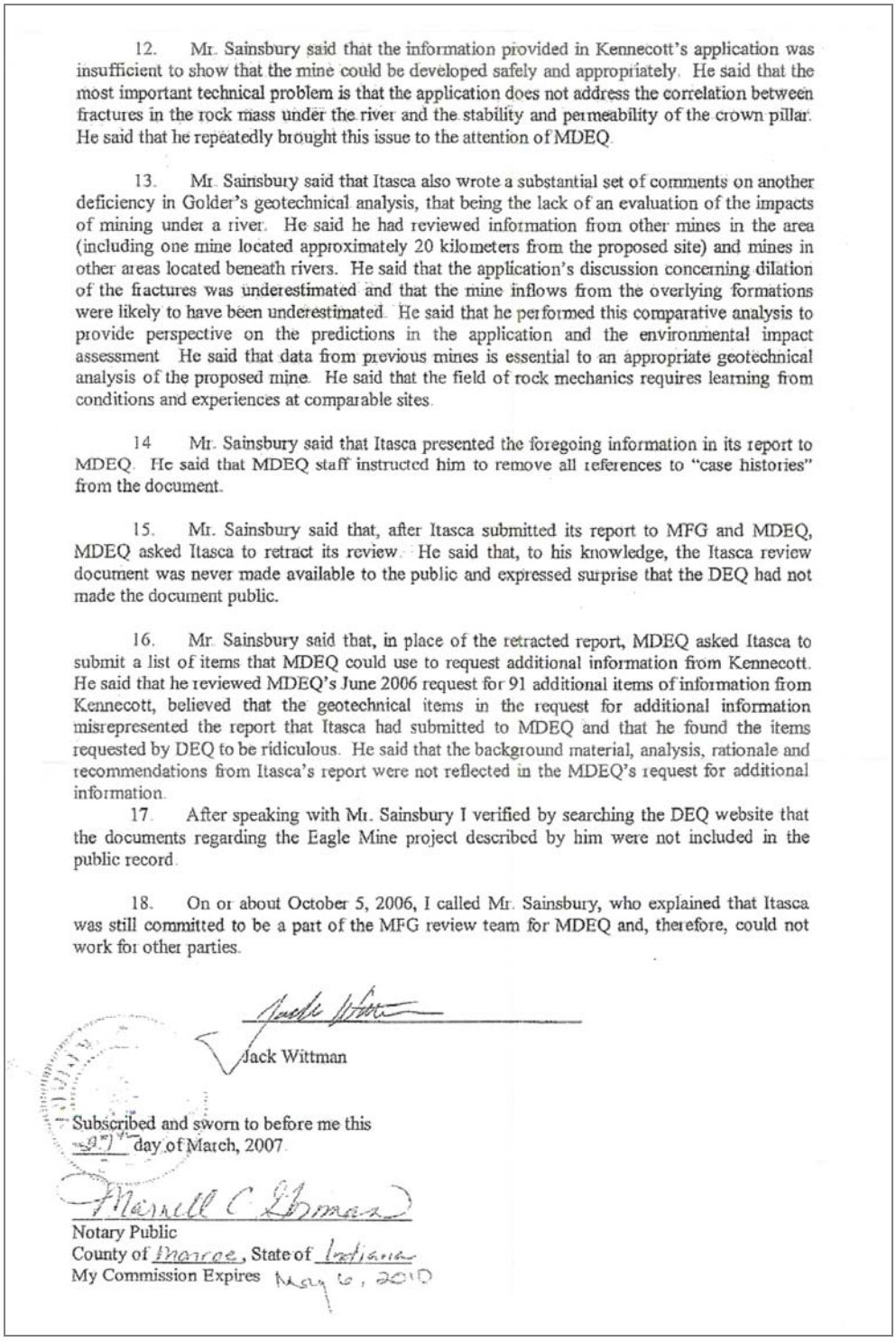
8. Mr. Sainsbury said that Itasca was hired as a subcontractor to MFG, Inc., which was leading the technical review of the Kennecott application for the MDEQ.

9. Mr. Sainsbury said that, as part of its work, Itasca performed a thorough review of the permit materials submitted by Kennecott and Kennecott's consultant, Golder Associates, giving particular attention to the crown pillar analysis for the mine.

10. Mr. Sainsbury said that Itasca wrote a 20-page document commenting on the crown pillar analysis and submitted the document to MFG and MDEQ. Mr. Sainsbury summarized his comments that the analysis of the crown pillar was not done according to industry standards, used out of date methodology and ignored available data from other mines in the area. Mr Sainsbury characterized the crown pillar analysis by Golder Associates as technically antiquated, sloppy and equivalent to high school level work.

11 Mr. Sainsbury said that Itasca's review caused significant discussion among MDEQ, MFG and Itasca. He said that that discussion led to a conversation between him and staff at Golder Associates (a consulting firm retained by KEMC to conduct subsidence analysis). Mr. Sainsbury said that Golder staff told him that Golder had limited time to perform its geotechnical analysis and, because Golder did not have a geotechnical engineer available at the time to devote to the work, Golder assigned the work of writing the crown pillar analysis to a geologist.

Figure 3. Signed and notarized affidavit from Dr. Jack Wittman, documenting a phone conversation he had with MDEQ consultant David Sainsbury regarding the KEMC application to mine (March 2007).



12. Mr. Sainsbury said that the information provided in Kennecott's application was insufficient to show that the mine could be developed safely and appropriately. He said that the most important technical problem is that the application does not address the correlation between fractures in the rock mass under the river and the stability and permeability of the crown pillar. He said that he repeatedly brought this issue to the attention of MDEQ.

13. Mr. Sainsbury said that Itasca also wrote a substantial set of comments on another deficiency in Golder's geotechnical analysis, that being the lack of an evaluation of the impacts of mining under a river. He said he had reviewed information from other mines in the area (including one mine located approximately 20 kilometers from the proposed site) and mines in other areas located beneath rivers. He said that the application's discussion concerning dilation of the fractures was underestimated and that the mine inflows from the overlying formations were likely to have been underestimated. He said that he performed this comparative analysis to provide perspective on the predictions in the application and the environmental impact assessment. He said that data from previous mines is essential to an appropriate geotechnical analysis of the proposed mine. He said that the field of rock mechanics requires learning from conditions and experiences at comparable sites.

14 Mr. Sainsbury said that Itasca presented the foregoing information in its report to MDEQ. He said that MDEQ staff instructed him to remove all references to "case histories" from the document.

15. Mr. Sainsbury said that, after Itasca submitted its report to MFG and MDEQ, MDEQ asked Itasca to retract its review. He said that, to his knowledge, the Itasca review document was never made available to the public and expressed surprise that the DEQ had not made the document public.

16. Mr. Sainsbury said that, in place of the retracted report, MDEQ asked Itasca to submit a list of items that MDEQ could use to request additional information from Kennecott. He said that he reviewed MDEQ's June 2006 request for 91 additional items of information from Kennecott, believed that the geotechnical items in the request for additional information misrepresented the report that Itasca had submitted to MDEQ and that he found the items requested by DEQ to be ridiculous. He said that the background material, analysis, rationale and recommendations from Itasca's report were not reflected in the MDEQ's request for additional information.

17. After speaking with Mr. Sainsbury I verified by searching the DEQ website that the documents regarding the Eagle Mine project described by him were not included in the public record.

18. On or about October 5, 2006, I called Mr. Sainsbury, who explained that Itasca was still committed to be a part of the MFG review team for MDEQ and, therefore, could not work for other parties.

Jack Wittman

Subscribed and sworn to before me this
27th day of March, 2007

Notary Public
County of Monroe, State of Indiana
My Commission Expires May 6, 2010

Figure 3. (cont.)

Those two documents will indicate to you the caliber of the work which went into the Kennecott application, and why the DEQ should never have accepted it.

Instead they had Sainsbury modify his report four or five times, omitting critical comments each time. They then suppressed his reports, produced them again when challenged, but they have ignored his warnings ever since.

An internal hearing and report on the suppression, by Dr. Donald Inman (an ex-DEQ official) and two of "Mining Team Leader" Joe Maki's co-workers, found that "Mistakes were made but no harm was done". Reminds me of Colin Powell.

Sainsbury's final note to the DEQ, in November 2006, does not change his conclusions – that the methods and conclusions in the application are not considered to be defensible – (not supported by fact). That letter, to Joe Maki at MDNR, is attached (See Appendix B).

MDEQ brought in a second mining expert, **Wilson Blake,** *to evaluate Sainsbury's report*. He was mostly agreeable with other experts but admitted that he had little use for their analytical methods, preferring to base his recommendations on his practical experience at many other mines.

He did not understand why Kennecott omitted unfavorable but crucial data from the files distributed to experts, planners and designers, or why MDEQ should delete case histories from Sainsbury's reports.

He erred seriously when he misquoted Sainsbury as saying that the thicker, 87.5 meter crown pillar would be "stable", four times in all, whereas Sainsbury, always careful with choice of words, actually described the thicker pillar as "substantial", as you will see in his November letter.

Blake ended both his draft report and his final report with a gratuitous comment – that the mining permits therefore should be granted, despite the fact that he had seen only a small portion of the application, had not read Part 632 of Michigan mining law, and had made no independent analyses of stability. I would ask who requested that closing comment.

Blake's Executive Summary is attached (See Appendix C).

4. CONCLUSIONS AND RECOMMENDATIONS. The professional evaluations of the application document were highly critical, from their first choice of experts - David Sainsbury - and from Parker and Vitton, the mining experts for the National Wildlife Federation.

Neither Kennecott nor MDEQ has disputed the criticisms – they simply ignored them and the loads of backup evidence – as if passage of the permits had been prearranged and assured.

The application should have been rejected immediately. There was no good reason to prolong an argument over the details in an incompetent and fraudulent application.

We recommend, therefore, that the application be rejected, belatedly but immediately, and that all permits and agreements be revoked, as required by Part 632, pages 12 and 13, when an applicant willfully makes deceptive presentations.

We recommend that the mining project pass from the hands of irresponsible management, to be regulated by experienced mining and geological personnel, to benefit both the miners and the coffers of the State, as required by law.

We believe that the mine can be redesigned and operated safely and profitably, with minimum adverse environmental effects, and that the site can be reclaimed to better than preexisting standards, but NOT by using the defective Kennecott plan.

REMEMBER THAT APPROVAL OF THIS FIRST APPLICATION WOULD SET EXTREMELY LOW STANDARDS FOR FUTURE MINING APPLICATIONS.

Jack Parker, Mining Engineer
Baltic MI 49963
906 – 288-3051

Appendix A

Covering letters authored by Foth & Van Dyke and KEMC
for the KEMC application to mine (February 2006)

(GREEN BAY)

Foth & Van Dyke – PREPARED THE APPLICATION.

February 14, 2006

Mr. Jon Cherry
Kennecott Minerals Company
1004 Harbor Hills Drive, Ste. 103
Marquette, MI 49855

Dear Mr. Cherry,

Re: Eagle Project –Mining Permit Application

Enclosed for your distribution is the *Eagle Project Mining Permit Application.* This application has been prepared according to the requirements of Part 632 of the Michigan Natural Resources Environmental Protection Act, and Michigan Administrative Rules codified under R 425.101 et. seq. !

Sincerely,

Foth & Van Dyke and Associates, Inc.

Stephen V. Donohue, P.H.
Senior Project Manager

John O Starke, P.E.
Senior Geotechnical Engineer

LJS\U:\scopes\04w018\10000\FVD reports\Final MPA\r-Mine Permit App text.doc
2737 South Ridge Road · P.O. Box 19012 · Green Bay, WI 54307-9012 · 920-497-2500 · Fax: 920-497-8516

Appendix A

(cont).

Jonathan C. Cherry, P.E.
Manager Environment and Governmental Affairs
Kennecott Eagle Minerals Company
1004 Harbor Hill Drive
Suite 103
Marquette, Michigan 49855
Phone: 906-225-5791
Email: Cherryj@Kennecott.com

Kennecott
Eagle Minerals

February 20, 2006 SUBMITTED.

Mr. Hal Fitch
State Geologist
Michigan Department of Environmental Quality
525 West Allegan St
Lansing, MI 48909

Mr. Joe Maki
District Geologist
Michigan Department of Environmental Quality
420 5th St
Gwinn, MI 49841

Dear Mr. Fitch & Mr. Maki,

Re: Eagle Project – Mining Permit Application

This *Mining Permit Application* and associated *Environmental Impact Assessment* provides to the Michigan Department of Environmental Quality (MDEQ) information to evaluate the Kennecott Eagle Minerals Company (KEMC) proposed nickel and copper Mine Project (hereafter referred to as the Eagle Project) for approval of a *Michigan Nonferrous Metallic Mineral Mining Permit*. This document was prepared in accordance with Michigan's Nonferrous Metallic Mineral Mining Rules and direct discussions with the MDEQ. Volume I and associated Appendices in Volume IA through Volume ID provide the following information:

- A mining plan.
- A reclamation plan.
- A monitoring and environmental protection plan including a treatment and containment plan.
- A contingency plan
- A permit application form.
- A description of the amount of financial assurance that will be provided for the project.
- A list of other applicable permits.
- An organization chart.

A check covering the permit fee will be provided under a separate cover as will an electronic copy of this application. Volume II contains the *Environmental Impact Assessment* (EIA) for the Eagle Project. Supporting Appendices for the EIA are provided in Volume IIA through Volume IIH. A checklist for submitting an administratively complete *Mining Permit Application* appears in Appendix A in Volume IA. That checklist contains document references addressing each listed item.

Tentative construction schedules developed during feasibility studies estimate general project construction to begin in early 2007 with ore production commencing in early 2009. KEMC is a subsidiary of Kennecott Minerals Company headquartered in Salt Lake City. Kennecott Minerals Company develops, manages, operates, and participates in base metal and precious metals mining operations in North America.

Thank you for your assistance in review of this document. If you need additional information or have questions, please contact me at (906) 225-5791.

Sincerely,

Kennecott Eagle Minerals Company

Jonathan C. Cherry, P.E.
Manager Environment & Governmental Affairs

cc: Steve Powers, Marquette County, w/o encl
John Olson, Michigamme Township, w/o encl

this first obvious lie

My One-L Moment

Appendix B

Memorandum sent by David Sainsbury to Joe Maki regarding Sainsbury's assessment of the KEMC application to mine (November 2006).

Technical Memorandum

ITASCA
Consulting Group, Inc.
an HCITASCA company

Date: November 9, 2006

To: Mahesh Vidyasagar and Ted Eary, MFG, Inc.
Joe Maki, Michigan DEQ.

From: David Sainsbury, Itasca Consulting Group, Inc.

Re: Crown Pillar Subsidence and Hydrologic Stability Assessment for the Proposed Eagle Mine *(DRAFT)*

Ref: ICG06-2420-49DTM

Itasca Consulting Group, Inc. (Itasca) has conducted a technical review of the Eagle Mine crown pillar stability analysis (Golder, 2005; Golder 2006a; Golder 2006b; Golder 2006c; Golder 2006d) that has been submitted to the Michigan Department of Environmental Quality (MDEQ) by Kennecott Eagle Minerals Company as part of a mining permit application.

Due to the difficulties associated with determining the mechanical properties of a rock mass from limited drill-core information, as well as the limitations of the rock mechanics analyses conducted thus far, an accurate assessment of the crown pillar subsidence and hydrologic stability cannot be made without further detailed field investigation and analysis.

The proposed mine plan allows for mine development to begin while further field investigation and analysis are conducted prior to mining above an elevation of 327.5 m (Phase 3 Mining Limit). This approach will allow for greater understanding of the actual rock mass response to mining prior to development of the actual crown pillar.

It is recommended that the initial mine permit be limited to development below the Phase 3 Mining Limit. This will result in a substantial 87.5 m thick crown pillar. Mining should not be permitted above the Phase 3 Mining Limit until further detailed field investigation and industry best practice analysis are conducted to determine the expected crown pillar subsidence and hydrologic stability.

Sincerely,

David Sainsbury.

David Sainsbury, Ph.D.
Itasca Consulting Group, Inc.

111 Third Avenue South, Suite 450 • Minneapolis, Minnesota 55401
Tel (612) 371-4711 • icg@itascacg.com • www.itascacg.com • Fax: (612) 371-4711

Appendix C

Executive Summary of report issued by Wilson Blake in which he evaluates David Sainsbury's assessment of the KEMC application to mine (December 2007).

EXECUTIVE SUMMARY

I have reviewed the reports submitted to NWF by Parker and Vitton (2006), Bjornerud (2007), and Vitton and Parker (2007). They all point out what they consider to be deficiencies with the KEMC Mining Permit Application and the backup Golder geotechnical work. And further, they conclude that a crown pillar over the Eagle Mine will not be stable. Previously, Itasca (Sainsbury, 2006a,b) had reviewed the stability of the crown pillar and reported deficiencies in the geotechnical studies, but concluded that an 87.5 m crown pillar would be stable, and that any further mining could not be carried out until a thorough underground geotechnical study were undertaken. Earlier this year I reviewed the Itasca, KEMC and Golder Reports and agreed with Itasca that an 87.5 m crown pillar would be stable, and that further underground geotechnical work was required (Blake, 2007).

The negative assessment of the stability of the crown pillar by Vitton and Parker is basically a result of the study Dr. Bjornerud carried out using the photos of the core boxes provided from a NWF request under the FOIA, and her surface inspection. In addition, the influence of the collapse to surface over the Athens Mine is also a big factor. Their concerns are real as any disruption of the surface or groundwater over the Eagle Mine would have very serious consequences. I share their concerns and I'm not pleased that the missing RMR data found in a few of the logged core holes were not all pointed out and satisfactorily explained by Golder. However, I do not agree with their conclusion that basically any crown pillar will be unstable.

I still conclude that the crown pillar is in fair to good rock and that an 87.5 m thick crown will be stable. It has not been established that the contact along the intrusive with the metasediments is a highly fractured zone, or that there are other direct water conduits to the crown pillar. The affect of the horizontal in situ stress on the stability of the crown pillar is still unknown – whether it acts to close or open joints or other structures, or has no affect.

I would also conclude that driving the access ramp will have no affect on the surface, and that the initial longitudinal mining at the bottom of the deposit will be carried out without any problems. Both Itasca and I have previously concluded that transverse longhole mining could be safely carried out up to the 327.5 m level. We also agreed that any mining above this level would require an extensive underground geotechnical investigation to delineate a stable crown pillar that took into account surface subsidence and hydrological affects. Hence, we endorsed the revised Mining Permit Application of KEMC.

I also recommend that the Phase 3 mining limit at the 327.5 m elevation remain in place, and that the previously endorsed underground geotechnical investigation, including in situ stress measurements, be carried out to establish a stable crown pillar that precludes adverse subsidence and/or hydrological affects.

This program should begin with in situ stress determinations carried out from the initial access openings at the bottom of the intrusive. The normal geologic, geotechnical and hydrological data would be collected from each of the sublevel access and panel openings as driven, and while panels were mined. Supplementary diamond drilling could also be carried out underground to fill in any gaps. This would allow a 3D physical model of the mine to be developed and maintained, as well as an accurate assessment of ground and hydrologic conditions, so that ground support requirements and the stability of the back/crown pillar were always maintained. Hence, by the time the 327.5 m elevation was reached, only a small amount of diamond drilling would be required to provide additional geologic, geotechnical and hydrologic data to supplement the 3D physical model. KEMC and their consultants would then be able to prepare and submit a thorough crown pillar stability document to the MDEQ in a timely manner. It should also be stated that any serious ground or ground water conditions encountered during mining up to the 327.5 m elevation would be a cause for great concern, would have to be reported to MDEQ. Any such stability or water problems would also have to be investigated and reviewed in order to allow mining to proceed.

While the issues and concerns raised by the NWF through Vitton, Parker and Bjornerud are legitimate, I still recommend that the revised Mining Permit Application of KEMC be approved.